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| 10/748,965 | 12/30/2003 | Chi Zhang | UC0228USNA | 8072 |

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EXAMINER

LEE, RIP A

ART UNIT PAPER NUMBER

1713

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/748,965

Applicant(s)

ZHANG, CHI

Examiner

Rip A. Lee

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 33-37 is/are rejected.
- 7) ☒ Claim(s) 26-32 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 05-07-04; 07-23-04; 10-14-2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 6-12, 14, 15, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Schwark *et al.* (EP 1 081 548).

Schwark *et al.* discloses a process of adding an effective amount of cosolvent to an aqueous solution from which poly(3,4-ethylenedioxythiophene)/polystyrene sulfonate, hereinafter referred to as "PEDOT/PSS," is cast. Specifically, paragraph [0039] teaches use of acetone, MEK, MIBK, MeOH, EtOH, *i*PrOH, and methoxy-2-propanol.

3. Claims 1-4, 18-25, 33, 34, and 37 are rejected under 35 U.S.C. 102(a) as being anticipated by Kim *et al.* (*Synthetic Metals*, 2002).

Kim *et al.* teaches a process of adding an effective amount of cosolvent to an aqueous solution of PEDOT/PSS. Specific solvents are DMSO, DMF, and THF in a volume ratio of 3:1 (see experimental).

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4. Claims 1-3, 18-25, and 33-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Cloots *et al.* (EP 1 003 179).

Cloots *et al.* teaches a process of adding an effective amount (between 0.1 to 49 wt %) of aprotic cosolvent to an aqueous solution of PEDOT/PSS. Aprotic solvents are DMSO, NMP, DMF, and DMA (see paragraphs [0011] and [0018]).

5. Claims 1-12, 14, 15, 33-35, and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Jonas *et al.* (U.S. 2002/0173579).

Jonas *et al.* discloses a process of adding an effective amount (5-1000 wt %) of cosolvent to an aqueous solution of PEDOT (paragraph [0074]). Specifically, paragraphs [0074] and [0078] enumerates the solvents acetone, MEK, MIBK, MeOH, EtOH, *i*PrOH, THF, MTBE, ethylene glycol monomethyl ether (2-methoxyethanol), NMF, and DMA.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cloots *et al.* in view of Lefebvre *et al.* (*Chem. Mater.*, 1999).

The discussion of the disclosures of Cloots *et al.* from paragraph 4 of this office action is incorporated here by reference. The does not disclose use of acetonitrile in the process of the invention, however, the inventors provide guidance as to the type of solvent used: the solvent is an aprotic compound having a dielectric constant greater than or equal to 15. Lefebvre *et al.* discloses synthesis of PEDOT/PSS in aqueous acetonitrile solutions, and apparently, this combination is suitable for obtaining stable solutions of polymerized product. Moreover, acetonitrile is an aprotic, water miscible solvent having a dielectric constant greater than 15 ($\epsilon = 37.5$ at 70° F), and one of ordinary skill in the art would have found it obvious that acetonitrile possesses the properties desired in the invention of Cloots *et al.* Since since Lefebvre *et al.* shows that acetonitrile is a useful solvent for making PEDOT/PSS, and absent any showing of criticality or unexpected results, one of ordinary skill in the art would have found it obvious to use acetonitrile in the process of Cloots *et al.* and thereby arrive at the subject matter of the instant claims.

9. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jonas *et al.* in view of Lefebvre *et al.*

The discussion of the disclosures of the prior art from paragraph 5 of this office action is incorporated here by reference. Jonas *et al.* does not indicate use of acetonitrile in the extensive listing of solvents, however, the inventors provide guidelines that the solvent should be water miscible so as to improve dissolution/dispersion of PEDOT/PSS (paragraphs [0074] and [0078]). Lefebvre *et al.* discloses synthesis of PEDOT/PSS in aqueous acetonitrile solutions, and apparently, this combination is suitable for obtaining stable solutions of polymerized product. Since acetonitrile is also water miscible, and since Lefebvre *et al.* shows that acetonitrile is a useful solvent for making PEDOT/PSS, and absent any showing of criticality or unexpected results, one of ordinary skill in the art would have found it obvious to use acetonitrile in the process of Jonas *et al.* and thereby arrive at the subject matter of the instant claims.

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10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jonas *et al.* (U.S. 2002/0173579) in view of Luebben *et al.* (U.S. 2003/0088032).

The prior art of Luebben *et al.* relates to making PEDOT type copolymers and dispersing them in appropriate solvent to process the copolymers (paragraph [0045]). Solvent mixtures are contemplated, provided that the solubility of the polymer is at least 0.1 g/L. Suitable solvents may be found in paragraph [0062], which lists 2-ethoxyethanol and 2-butoxyethanol. Although Jonas *et al.* discloses use of 2-methoxyethanol, and not 2-butoxyethanol, one having ordinary skill in the art would have found it obvious that 2-methoxyethanol and 2-butoxyethanol are homologues, and that both are species of the genus of alcohol ethers. In absence of any showing of criticality or unexpected results, one of ordinary skill in the art, having read both disclosures, would have found it obvious to use 2-butoxyethanol in the process described in Jonas *et al.* Because 2-butoxyethanol is a homologue of the recited 2-methoxyethanol, one of ordinary skill in the art would have expected such a combination to work, and since 2-butoxyethanol is a species of the genus of alcohol ethers, one of ordinary skill in the art would have all species within the genus to work equally well.

11. Claims 26-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited references teaches or fairly suggests use of amine solvents and carboxylic acid solvents in the processes disclosed therein. Absent any motivation or suggestion to do so, it is maintained that one of ordinary skill in the art would not have found it obvious to arrive at the subject matter of claims 26-32.

Information Disclosure Statement

12. References in the information disclosure statement of July 23, 2004 were not considered because they were cited previously in the IDS of May 7, 2004.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

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March 15, 2006


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SUPERVISORY PATENT EXAMINER
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